

## PERTH MODERN SCHOOL

Exceptional schooling. Exceptional students.

Independent Public School

Course Metho	ods	Year 11
Student name:	Solutions	Teacher name:
Date: 27/07/20		
Task type:	Response	
Time allowed for this task: 30 mins		
Number of questions:	5	
Materials required:	NO CALCULATORS ALLOWED ONE A4 PAGE BOTH SIDES OF NOTES ALLOWED FORMULA SHEET PROVIDED	
Standard items:	Pens (blue/black preferred), pencils (including coloured), sharpener, correction fluid/tape, eraser, ruler, highlighters	
Special items:	Drawing instruments, templates and formula sheet	
Marks available:	30 marks	
Task weighting:	10 %	
Formula sheet provided:	Yes	
Note: All part questions worth more than 2 marks require working to obtain full marks.		

Question 1 (1.3.2)

(2, 2 = 4 marks)

Evaluate and express your answer in whole numbers.

i) 
$$6! = 6 \times 5 \times 4 \times 3 \times 2 \times 1$$
  
=  $720$ 

ii) 
$$\binom{10}{6} = \frac{10!}{(10-6)!} 6!$$

$$= \frac{10!}{4! 6!} \checkmark$$

$$= \frac{10 \times 9 \times 8 \times 7}{4 \times 3 \times 2}$$

$$= 210. \checkmark$$

Question 2 (1.3.1)

(2, 3 = 5 marks)

a) Expand  $(1-x)^4$  in ascending powers of x. Express your answer as whole numbers.

$$= x^{4} - 4x^{3} + 6x^{2} - 4x + 1$$

b) Show how you would use your answer in (a) to calculate the value of 0.994. State this value correct to 4 decimal places.

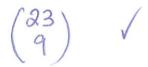
$$(1-0.01)^{4} = (0.01)^{4} + 4(0.01)^{3} + 6(0.01)^{2} + 4(0.01)$$
  
= 0.9606

## Question 3 (1.3.2)

(1, 1, 1, 2, 2 = 7 marks)

The Australian Chess team of 9 people is to be selected from 10 from West Australia, 8 from NSW and 5 from Victoria. Write mathematical expressions for the number of different ways the team can be selected if:

a) There are no restrictions



b) All three states are equally represented.

$$\binom{10}{3}\binom{8}{3}\binom{5}{3}$$

c) There are no Victorians

$$\binom{18}{9}$$

d) The NSW representatives are in the majority

The NSW representatives are in the majority
$$\binom{8}{5}\binom{15}{4} + \binom{8}{6}\binom{15}{3} + \binom{8}{7}\binom{15}{2} + \binom{8}{8}\binom{15}{1}$$

e) The WA husband and wife pair Elise and Nathan can only afford to have one of them in the team.

$$\binom{23}{9} - \binom{2}{2} \binom{21}{7}$$

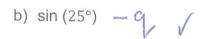
4|Page 
$$\binom{2}{1}\binom{21}{8}+\binom{21}{9}$$

## Question 4 (1.2.7)

(1, 1, 1, 1, 2, 2 = 8 marks)

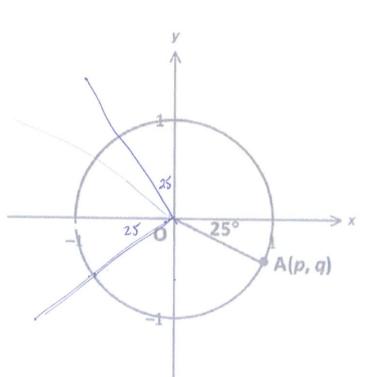
The diagram shows a unit circle with centre O. A is a point on the unit circle with co-ordinates (p,q). The ray OA is inclined at an angle of 25° to the positive x-axis as shown. Use the unit circle to find in terms of p and/or q:

a) 
$$\cos -25^{\circ} = P /$$









Question 5

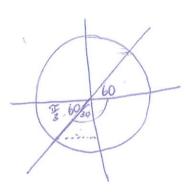
(1.2.8)

(2, 2, 2 = 6 marks)

What are the exact values of

a) 
$$\sin\left(-\frac{2\pi}{3}\right) = -\sin 60$$

$$= -\sqrt{3}$$



b) 
$$\tan\left(\frac{15\pi}{6}\right) = \tan\left(\frac{12\pi}{6} + \frac{3\pi}{6}\right)$$

$$= \tan 90^{\circ}$$

$$= Undefined$$

c) 
$$\cos 210^{\circ} = -\cos 30$$

